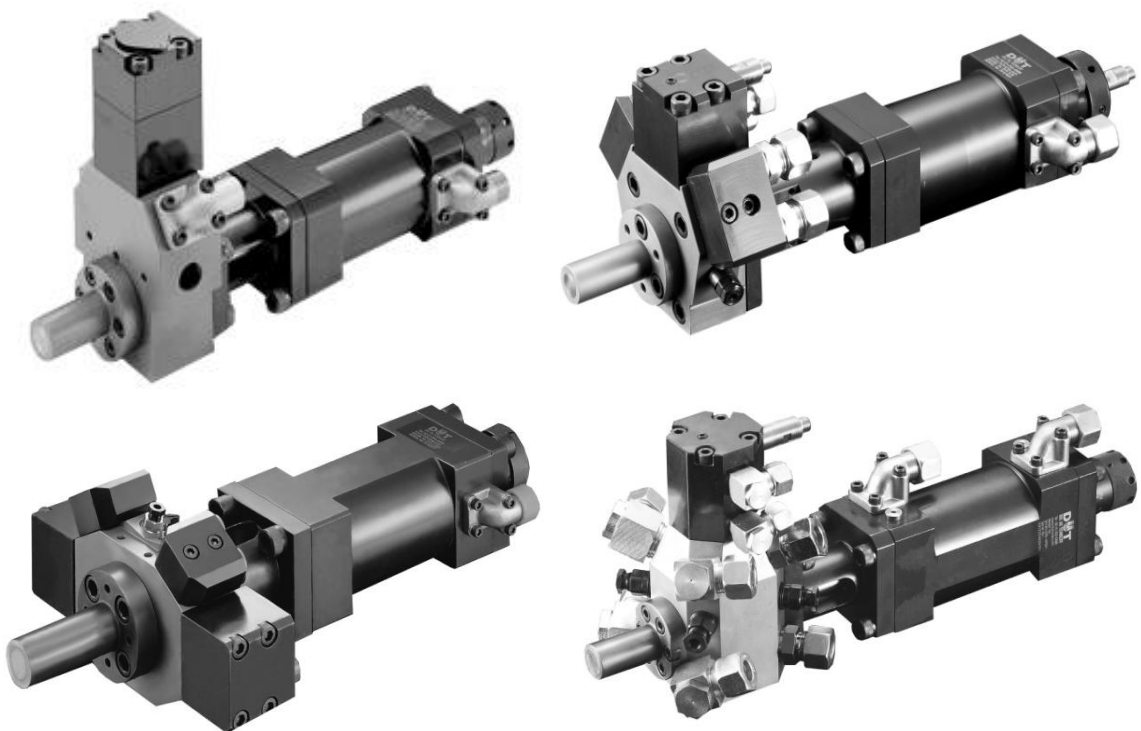


User Manual

DHV/DHVA - Series



CONTENTS

- 1. Specification**
 - 1-1. Throughput**
 - 1-2. Schematic**
 - 1-3. Operating Pressure**
- 2. Installation & Connection**
 - 2-1. Mounting Type**
 - 2-2. Available Mounting Method**
 - 2-3. Before Installation**
- 3. Test Working**
- 4. Proximity Sensors**
 - 4-1. Schematic for DHV/DHS-Series**
 - 4-2. Schematic for DHVA- Series**
 - 4-3. The models of sensor and specification for each mixing head**
 - 4-4. Circuit Diagram**
- 5. Choice of Mixing head**
 - 5-1. Throughput, Pressure & Mixing Ratio**
 - 5-2. Adjusting throughput and pressure**
- 6. Adjusting of Throttle**
- 7. Calibrating of Throughput**
- 8. Nozzles & Nozzle Cone**
- 9. Requested Bolting Torque**

WARNING

In case of emergency during processing of PUR systems.

Eye contamination : Rinse out immediately in an eyewash or water for several minutes, consult a doctor.

Skin contamination : Wipe off immediately with dry cloth, wash skin thoroughly with soap and water. Clothing contaminated by B component (red drum) should be changed immediately.

Breathlessness, asthma, chest pains : Go immediately into the fresh air, stop smoking, relax. If the cause is due to TDI (B component identified by skull and crossbones), consult a doctor.

Spilt ISOCYANATE (B component) : Cover spillage with sand or earth. Pour neutralizing agent (diluted ammoniac solution) over residue. If TDI is spilt, respiratory masks should be worn on.

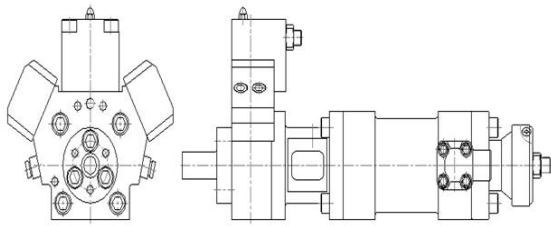
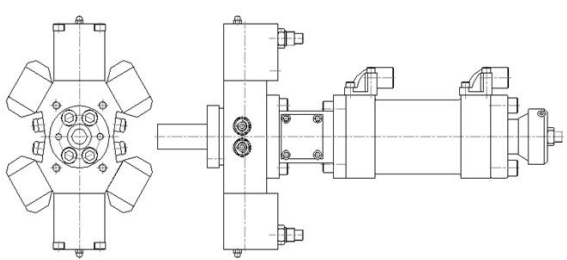
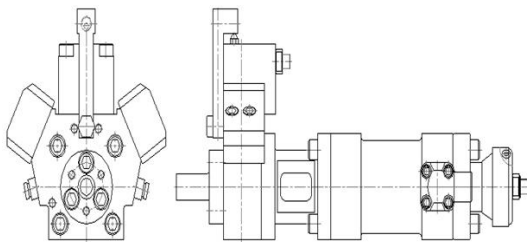
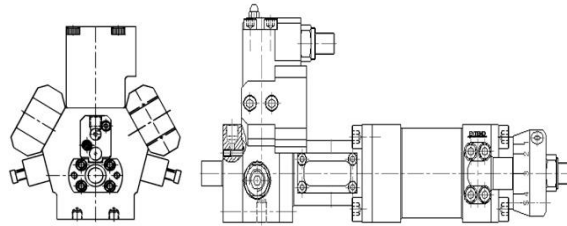
When handling A and B components, protective gloves and goggles should be worn on at all times.

1. Specifications

1-1) Throughput

MODEL	Close mould(g/sec)			Open Mould (g/sec)	REMARK
	1:1	2:1	3:1		
DHV-0507-2K/3K	15~210	20~180	30~120	15~120	LEGEND 2K: Single head 3K: Single head + pigment 4K: Double head 4KS: Single head With 4 components 4KSH: Single head with 4 components of hydraulic nozzles
DHV-0812-2K/3K DHVA-0814-2K/4K	50~430	60~330	70~290	50~250	
DHV-1014-2K/3K DHVA-1014-4KSH DHVA-1014-4KSHF DHVA-1016-2K	100~720	100~620	110~540	80~400	
DHV-1218-2K/3K DHVA-1220-2K/2KF	130~1000	130~950	150~900	130~500	
DHV-1422-2K/4K DHVA-1425-4K	300~2500	420~2400	500~2150	300~850	
DHV-1625-2K/4K	320~1650	340~1500	360~1450	400~1000	
DHVA-1220-4K DHVA-1220-4KSH	130~1000	130~950	150~900	130~500	

1-2) Schematic

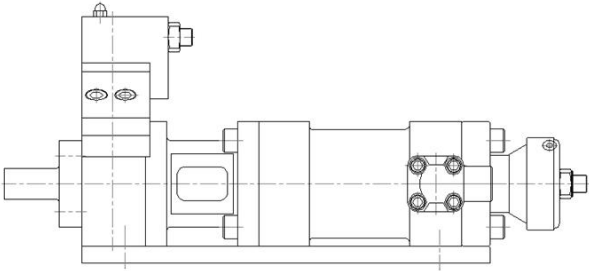
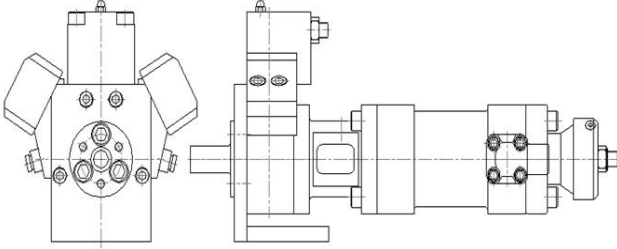
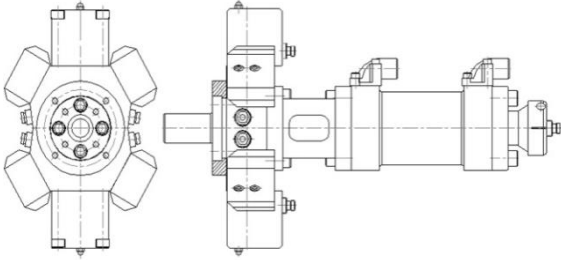
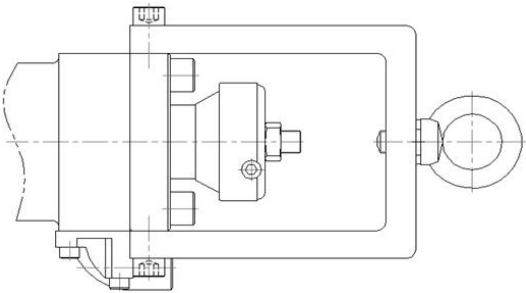
	
2 Components Mixing Head	4 Components Mixing Head
	
3 Components Mixing Head(Pigment Tube Type)	3 Components Mixing Head(Tubeless Type)

1-3) Operating Pressure

- Maximum pressure for hydraulic is 210 bar, but 80 to 150 bar is recommended for stable operating.
- For mixing between **POLYOL** and **ISOCYANATE**, pressure is recommended from 100 to 180bar for best mixing efficiency.

2. Installation & Connection

2-1) Mounting Type

	
With Bottom Plate (BP)	With Front Plate on M/H Housing (FP)
	
With Front Grip on Outlet Pipe (FG)	With Han Ging on Clean Cylinder (H)

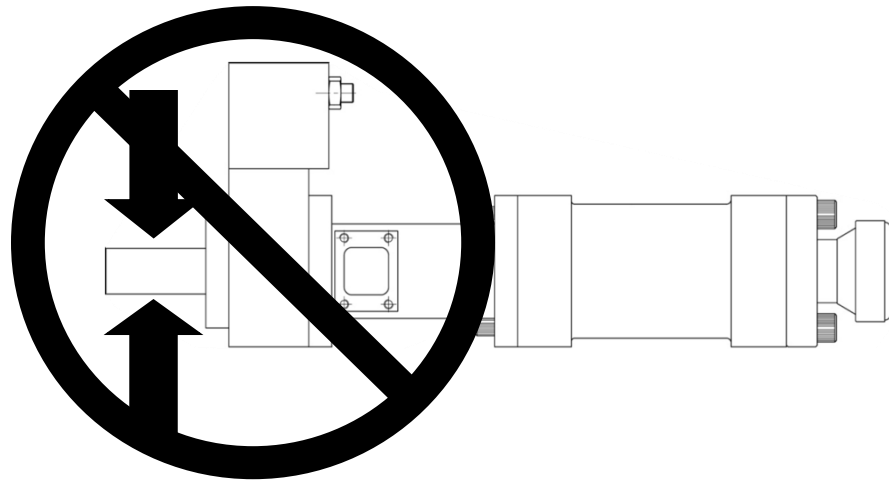
2-2) Compatible Mounting Type

Model	BP	FP	FG	H	Remarks
DHV-0507	O			O	
DHV-0812 DHVA-0814	O			O	
DHV-1014 DHVA-1016	O			O	
DHV-1218 DHVA-1220	O			O	
DHV-1422 DHVA-1425	O	O	O	O	
DHV-1625	O	O		O	

2-3) Before installation

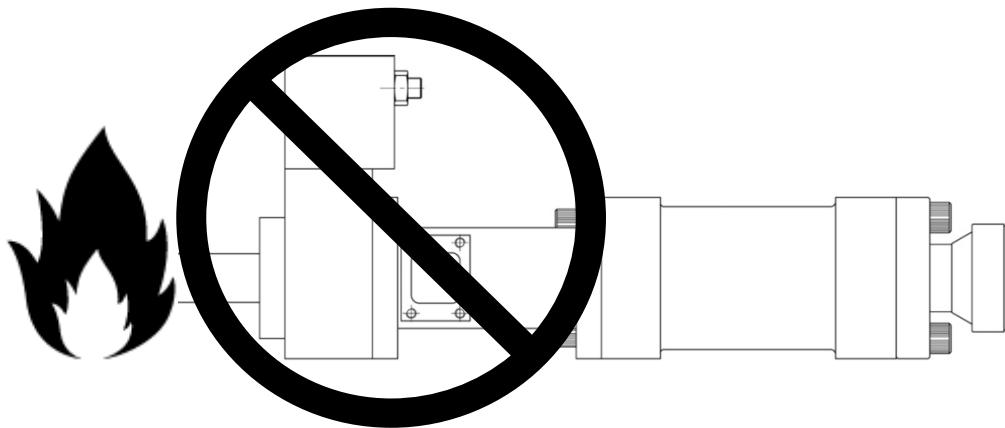
To use correct way of mixing head, please check the descriptions as below.

1) Do not tighten the end part of the head (Outlet pipe) to the mould by clamps or any other devices.

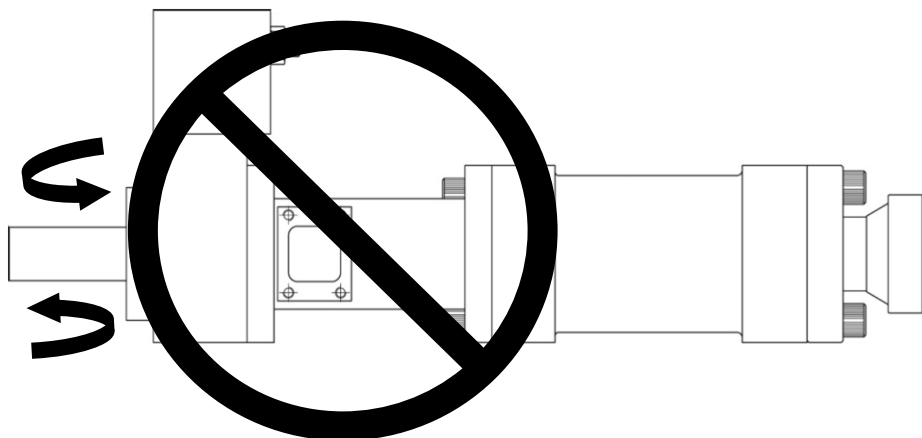


2) The head must not be exposed over 90°C. Deviation of the end part of head (Outlet Pipe) must be $\pm 10^{\circ}\text{C}$.

- 3) Heating to the end part of Mixing Head (Outlet Pipe) for disassembly is not allowed.
It causes transformation of Mixing Head.



- 4) Do not over tighten a bolt than the regular bolting torque. (Refer to requested bolting torque)



3. Test Working

Notice

Before starting to carry out any operation of this head, cleaning piston rod(P/No:06) on this mixing head has to be wetted by MESAMOL or DOP.

And before operating, supply lubricant into lubricant inlet on the head, and this Mixing Head must be thoroughly cleaned out by lubricant at the end of each shift.

3-1) You should connect all fitting for hydraulic, 2 components(A and B), and pigment (For 3K). Also, you should connect 2 proximity sensors' cable to control unit of your equipment.

3-2) You should deflate air from cleaning cylinder and M/C cylinder to work smoothly before operating. To deflate air, retract and extend cleaning piston for several times and fix cleaning piston on retract pouring position then retract and extend M/C piston for several times by hydraulic.

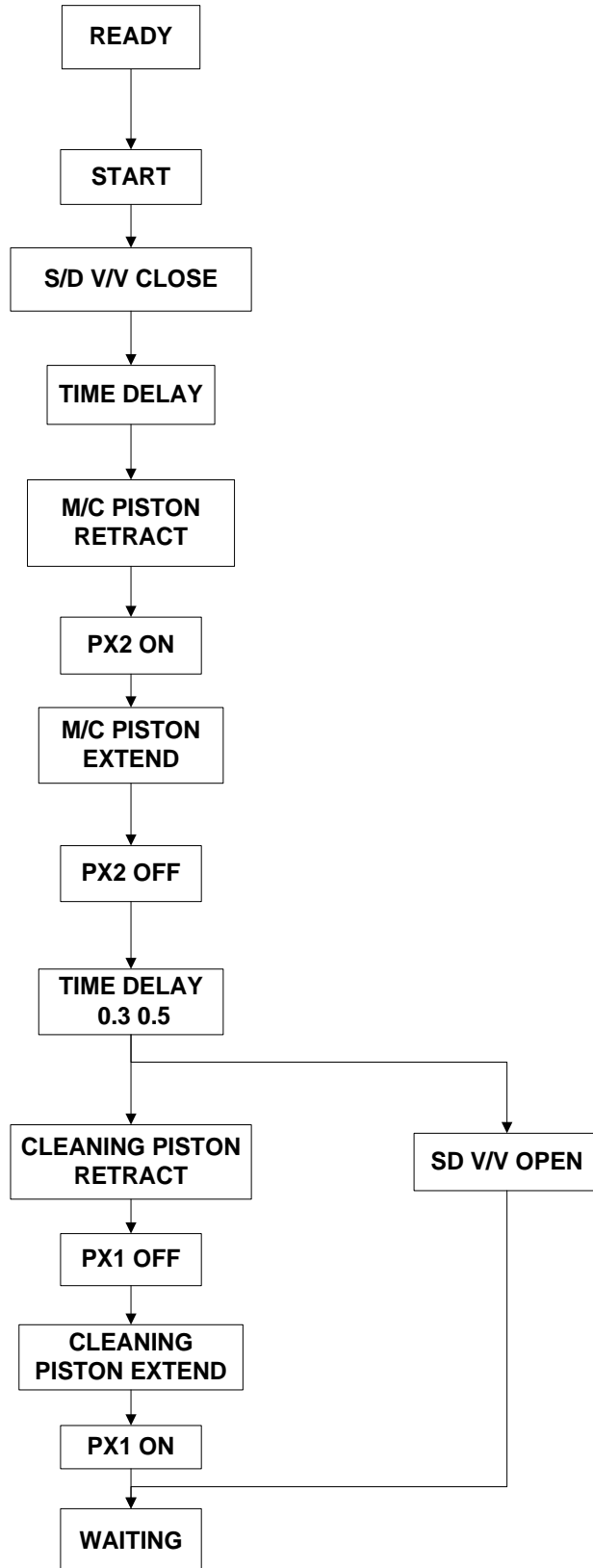
3-3) When operating of cleaning piston and M/C piston, check out if proximity sensors operate in normal.

3-4) Pouring Sequence

(Backward Type for Cleaning Piston)

Notice

To prevent locking of Cleaning Piston, Backward type is set as default.(It makes to be able to pouring even in trouble of sensor.)

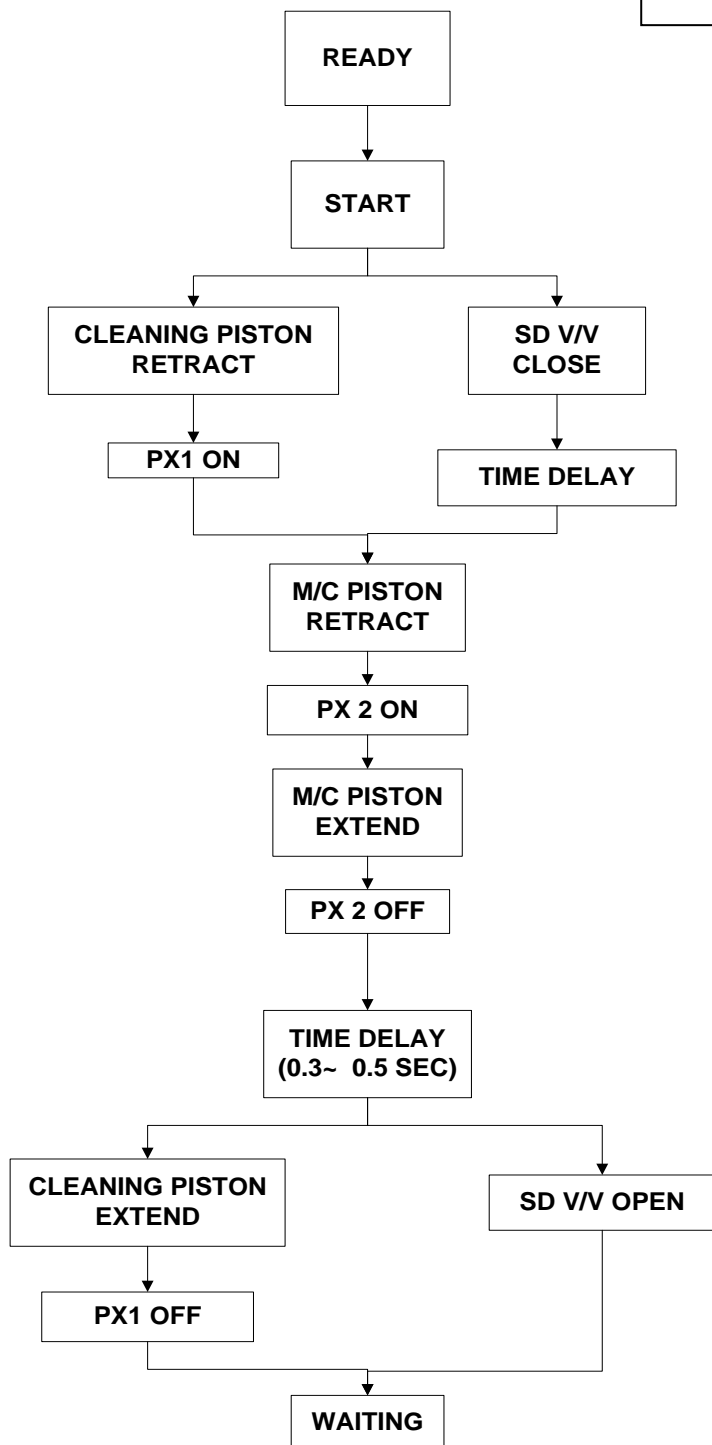


START TO WORK	- All units in normal status. -Each components are circulated by low pressure
READY TO POUR	-Each components are circulated to tanks through nozzle and groove of M/C piston rod with high pressure -Flow rate and circulating pressure of each components are stabled
POURING	-Pouring process
POURING STOP	-High pressure recirculating
CLEANING	-Low pressure recirculating
END OF ONE CYCLE	-The end of one cycle

(Forward Type for Cleaning Piston)

Notice

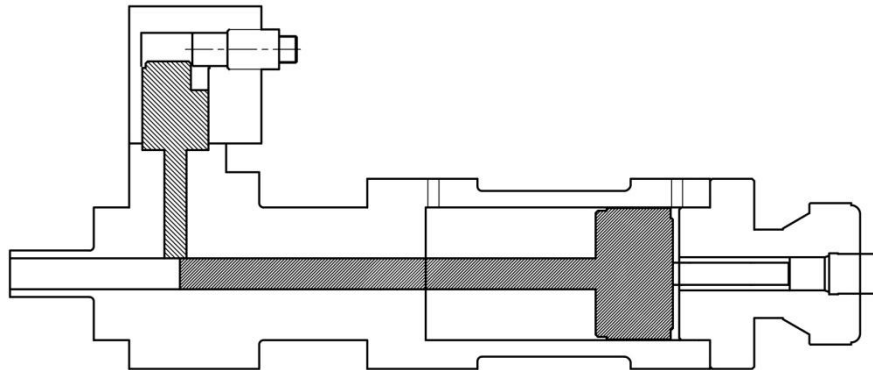
Default is set as Backward Type so if you need to set as Forward Type, please contact with a Production Engineering Team.



START TO WORK	- All units in normal status. -Each components are circulated by low pressure
READY TO POUR	-Each components are circulated to tanks through nozzle and groove of M/C piston rod with high pressure -Flow rate and circulating pressure of each components are stabled
POURING	-Pouring process
POURING STOP	-High pressure recirculating
CLEANING	-Low pressure recirculating
END OF ONE CYCLE	-The end of one cycle

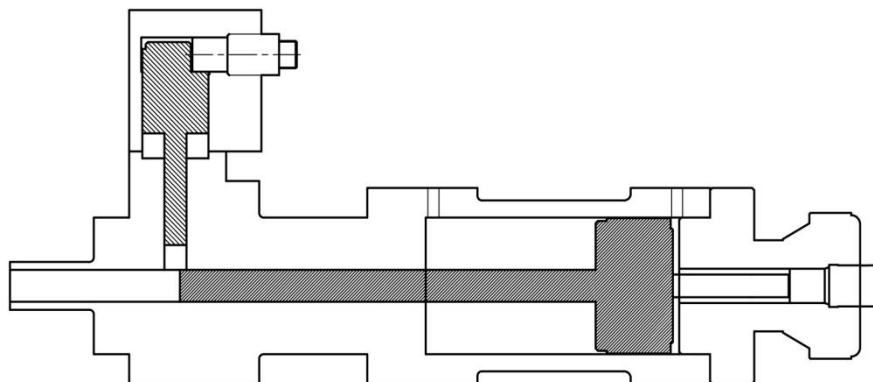
3-5) Operation Principle

(Backward Type for Cleaning Piston)



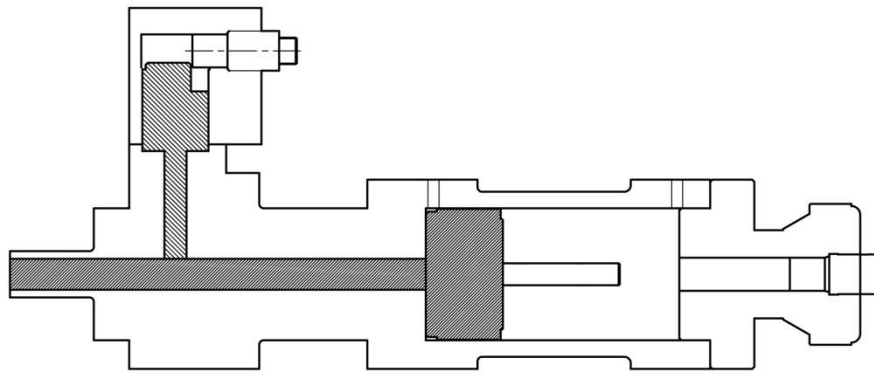
(Fig 1. Ready to Pour)

Proximity sensor catches the piston then it makes moving the MC piston to backward. Bypass valve is closed and it changes to high pressure. **Nozzle size** makes POLYOL and ISOCYANATE output with the specified time and amount.



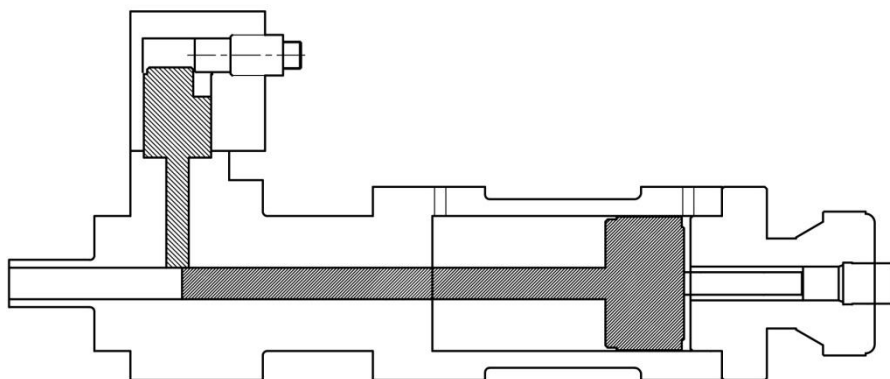
(Fig 2. Pouring Position)

When the mixed liquid(POLYOL & ISOCYANATE) is outputted, M/C piston is closed and proximity switch becomes off.



(Fig 3. Recirculating Position)

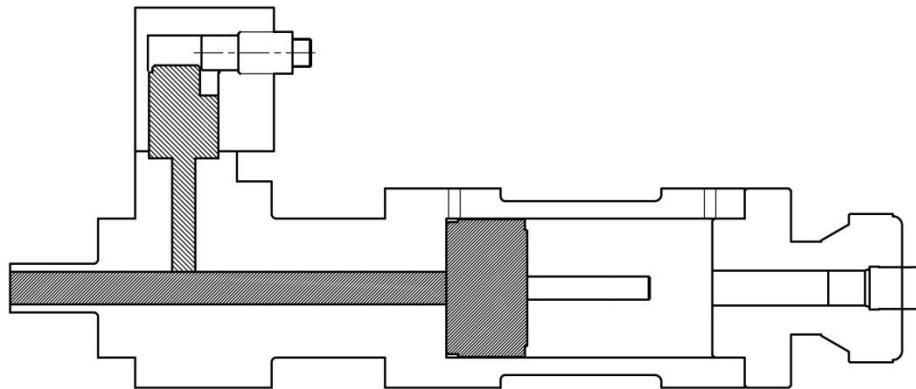
After that Cleaning piston moves forward and doing self-cleaning operation with letting the mixed liquid residue go out.



(Fig 4. Ready to next Recirculation)

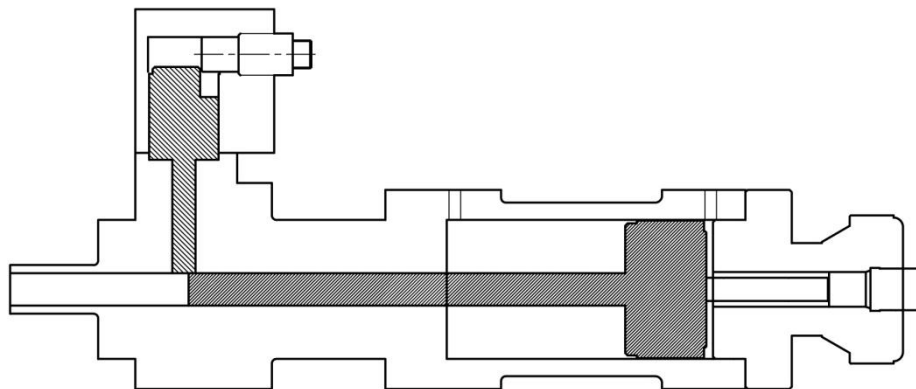
One cycle has completed and get ready to next recirculation

(Forward Type for Cleaning Piston)



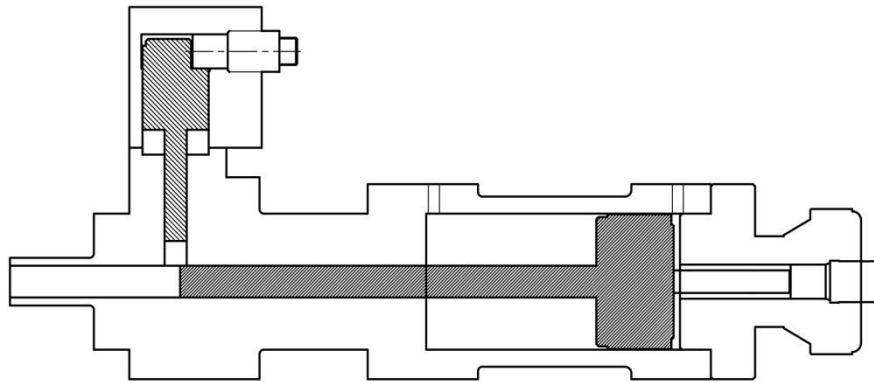
(Fig 5. Recirculating Position)

POLYOL and ISOCYANATE are on circulating status. Bypass valve is opened in status of low pressure and to pour, it is closed in status of high pressure.



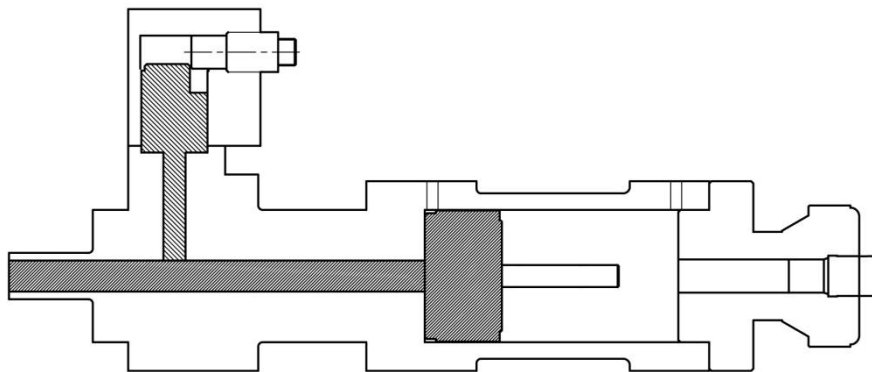
(Fig 6. Ready to Pour)

While being changed to high pressure status, cleaning piston moves backward to be ready for foaming. When Cleaning piston moves back completely, proximity sensor catches the piston then it makes moving the MC piston to backward. **Nozzle size** makes POLYOL and ISOCYANATE output with the specified time and amount.



(Fig 7. Pouring Position)

When the mixed liquid(POLYOL & ISOCYANATE) is outputted, M/C piston is closed and proximity switch becomes off. After that Cleaning piston moves forward and doing self-cleaning operation with letting the mixed liquid residue go out.



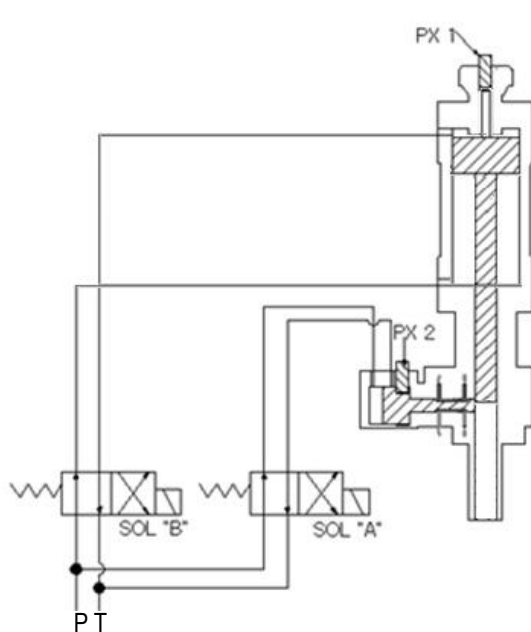
(Fig 8. Ready to next Recirculation)

One cycle has completed and get ready to next recirculation

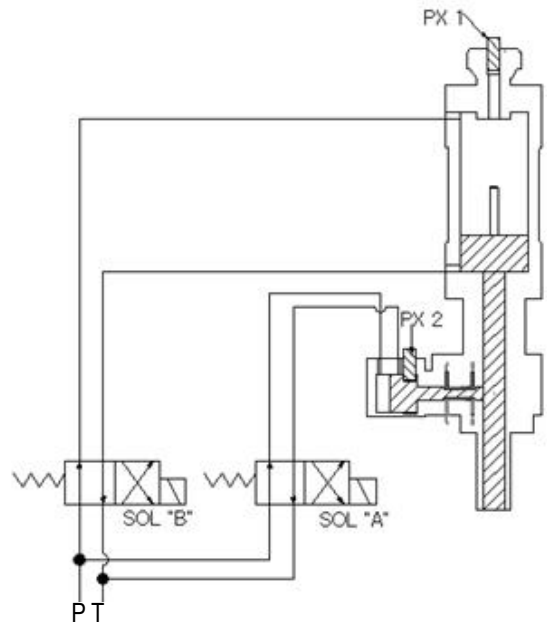
3-6) Hydraulic schematic

Notice

For DHV-1422-4K and DHVA-1425-4K, Proximity(PX) sensor on M/C is located as figure below, but the others are located in opposite direction.



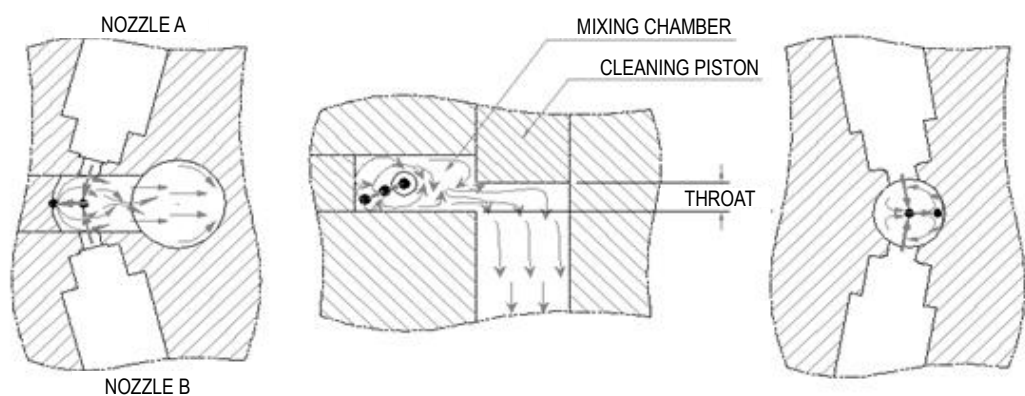
(Fig 9. Hydraulic Circuit for Backward Type)



(Fig 10. Hydraulic Circuit for Forward Type)

3-7) Structural Explanation

1) Nozzle spraying method with double tilted angle for DHV-series



(Fig 11. Structural Explanation)

2) The structure of double tilted angle in DHV-series

First, offsetting the kinetic energy and fluid viscosity friction each other,
Second, including very low kinematic energy after passing the throttle,
Third, excellent mixing efficiency make laminar flow.

3) Input lubrication agent

In order to increase durability of Mixing Head, supply space tube with release agent. Inputting release agent makes it prolong maintenance period.

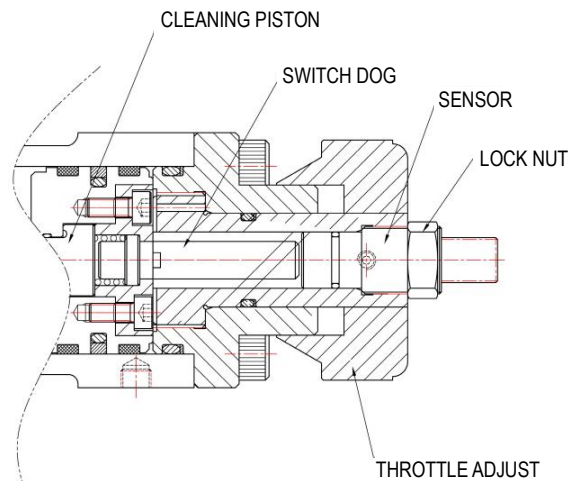
4. Proximity Sensors

Adopting proximity switch for reliability in DHV/DHVA series

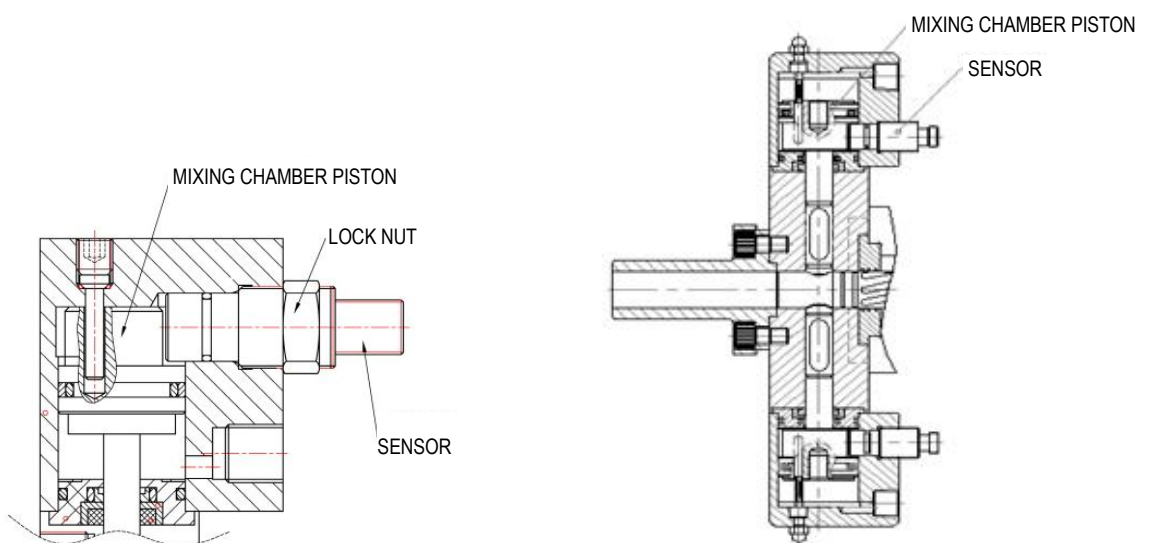
In order to increase reliability of sequence, proximity switches for high pressure are installed on cylinder respectively.

4-1) Schematic for DHV series

The assembly of sensor should be done at the torque of 6 ~ 8 Nm.



(Fig 12. Cleaning Side)



(Fig 13. M/C side)

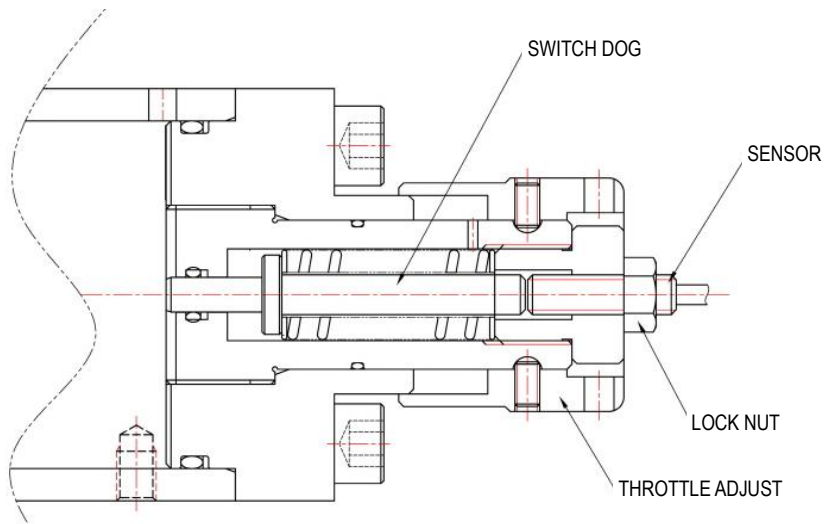
For all DHV-series except DHV-1422-4K

(Fig 14. M/C side)

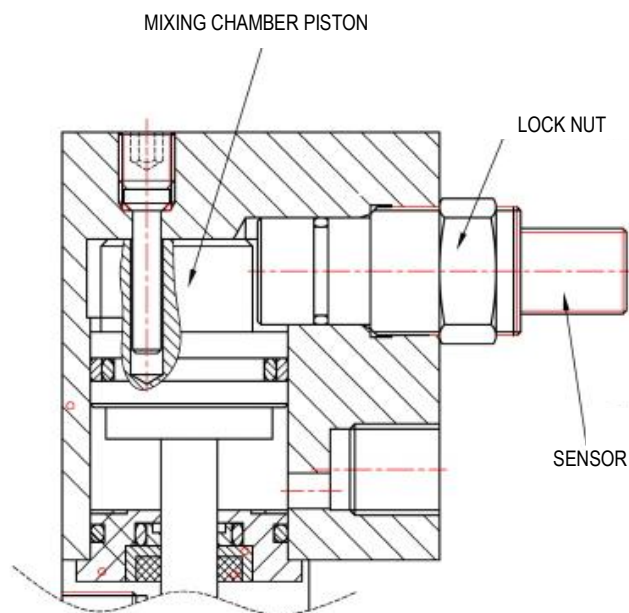
For DHV-1422-4K

4-2) Schematic for DHVA-series

The assembly of sensor should be done at the torque of 6 ~ 8 Nm.



(Fig 15. Cleaning Side)



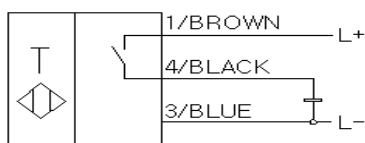
(Fig 16. M/C for all DHVA-series except DHVA-1425)

4-3) The models of sensor and specification for each mixing head

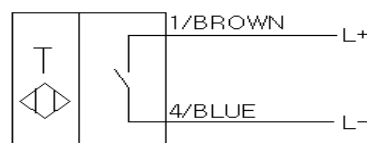
Mixing head	Code number of P/X sensor	Sensing Distance	Transistor	Operation Voltage	Static/Dynamic Pressure (bar)	Connection
DHV Series & DHVA's M/C Piston	NJ1,5-18GM-N-D-V1 (PEPPERL + FUCHS)	1.5 mm	2 Wires Type	DC 8V	350 for namur	M12 Connector (Explosion Type)
	NJ1,5-18GM-E2-D-V1 (PEPPERL + FUCHS)	1.5 mm	3 Wires Type PnP	DC 24V	350	M12 Connector
DHVA For Cleaning Piston	E2E-X1R5F1-M1 (OMRON)	1.5mm	3 Wires Type PnP	DC 24V	Low Pressure	M12 Connector

- Housing material : High grade steel (Only for MJ1, 5-18GM-N-D-V1 and NJ1,5-18GM-E2-D-V1)
- Sense face : Ceramic (Only for MJ1, 5-18GM-N-D-V1 and NJ1,5-18GM-E2-D-V1)
- Depending on equipment, the voltage for operation can be changed.

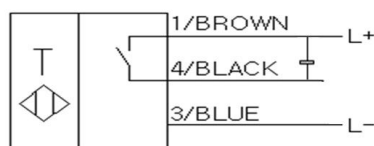
4-4) Circuit Diagram



(Fig. 17. Wires Type for PnP - 3wires)



(Fig 18. 2-Wires Type - 2wires)



(Fig 19. 3-Wires Type for NpN - 3wires)

Notice

DUT supplies PnP type (Standard) for sensor, but please contact us if you want to use NpN type of sensor.

5. Choice of Mixing Head

Throughput, Pressure & Mixing Ratio

Notice

The most important thing to maximize mixing efficiency is to choose suitable diameter of nozzle cone in applicable pressure.

5-1) DUT have many types of Mixing Head. You may choose applicable Mixing Head to fit your purpose,

5-2) Firstly, choose an optimum Mixing Head, it is very important that you choose an optimal Mixing Head in order to maximize the effectiveness. Namely, you must determine the correct nozzle size for each reactive component and the optimum impingement pressure for each flow. DUT suggest you can choose the applicable nozzle size and impingement pressure as the simplest method. You can calculate the applicable nozzle size according to below equation.

$$d = 0.378 \sqrt{Q/\sqrt{P}}$$

d = Diameter of Nozzle Cone [mm]

Q = Throughput of Each Component [g/sec]

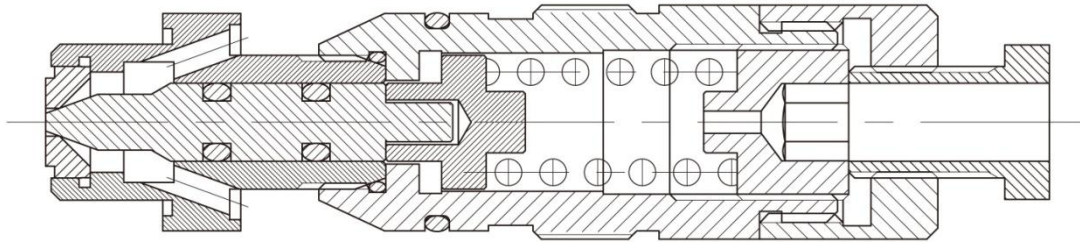
P = The desired Impingement Pressure [bar]

The above-mentioned equation is from our experience with electronic flow analysis.

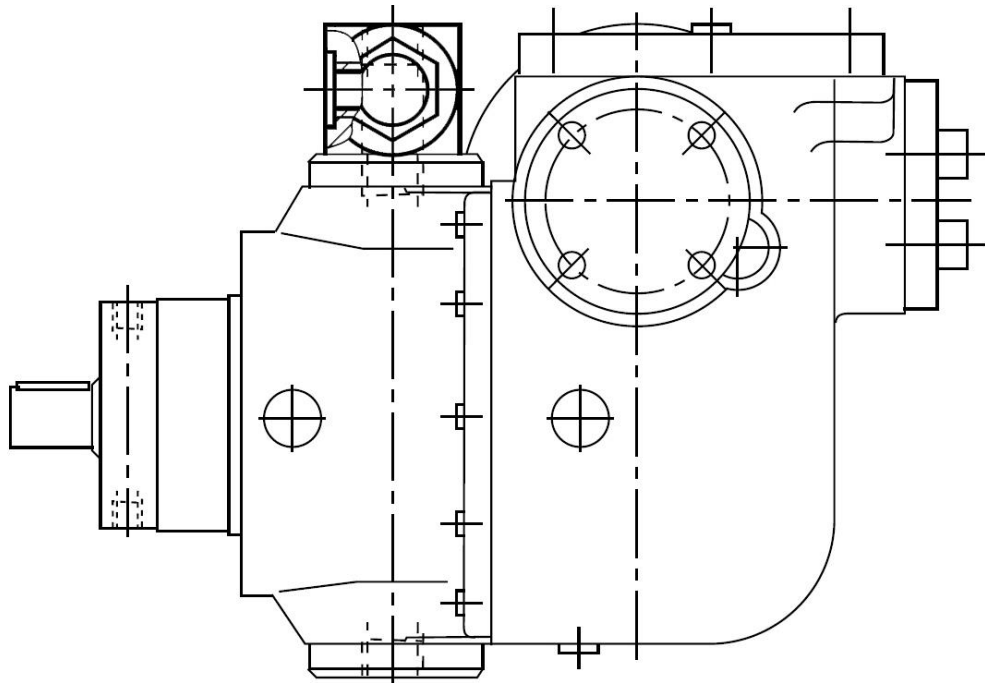
DUT inform you should choose a slightly larger diameter than calculated diameter from equation above.

In accordance with some subject, the minimum acceptable impingement velocity so as to mix in high pressure mixing head is 100 meters per second. And they state that impingement velocities in order to get optimum efficiency will be needed to be 130 meters per second in processing high viscosity or hard to mix system.

5-3) Adjusting Throughput and Pressure



(Fig 20. Nozzles)

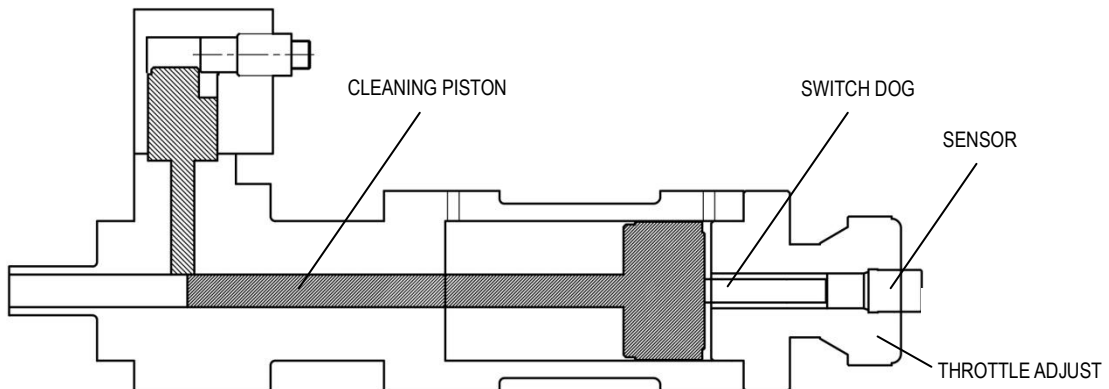


(Fig 21. Metering Pump)

You already know nozzle diameter, impingement pressure and throughput of each component. And then you may adjust the pressure and throughput by rotating needle of nozzle and manual handle of pump.

6. Adjusting Throttle

Description below is to adjust throttle of your Mixing Head.



When shipping, all mix head will be settled the throttle to zero. So you should adjust throttle to fit your purpose. And we notice that you would not close the throttle too much.

7. Calibrating Throughput

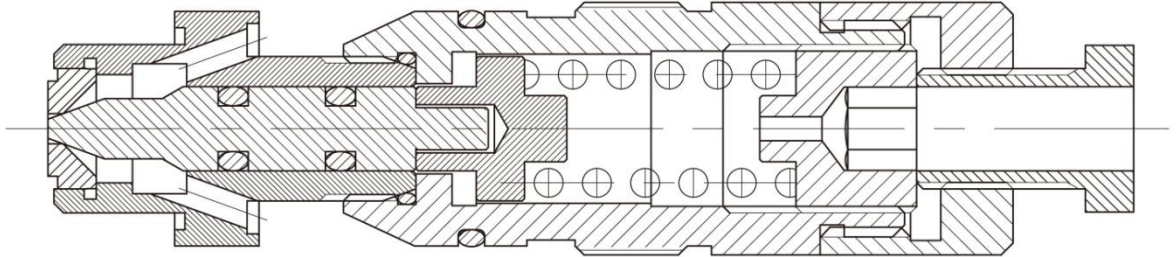
If customers request dummy nozzle for calibration, we may provide it. This dummy nozzle acts a component not to flow in/out mixing chamber. So on calibrating Polyol part, you should insert this dummy nozzle to iso side instead of regular nozzle assembly. After calibrating Polyol part, disassemble nozzle assembly of POLYOL part and insert another dummy nozzle in it and do above one more time for calibration of ISOCYANATE part.

Notice

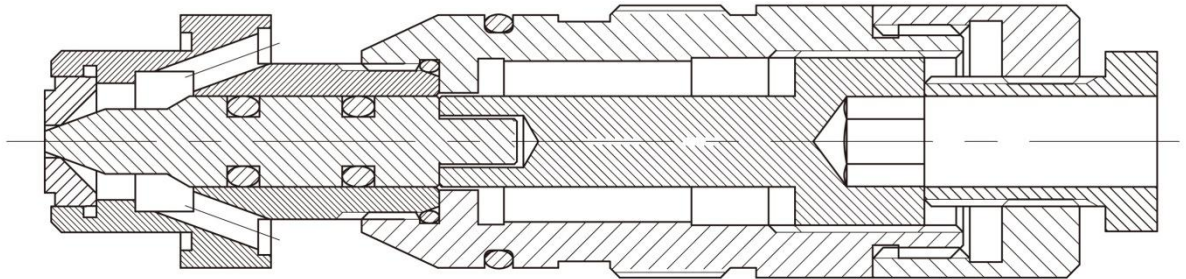
Dummy nozzle is not required for new version of DUT nozzle (NDSN)

8. Nozzles

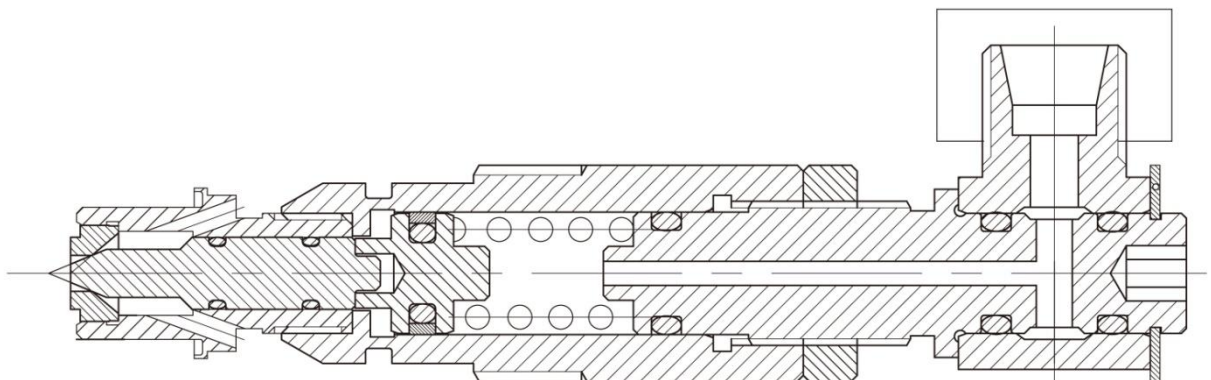
DUT has 3 kinds of Nozzle. Please check your correct nozzle from figure below.



(Fig 23. NDSN-Type)



(Fig 24. NDCN-Type)



(Fig 25. DHN-Type)

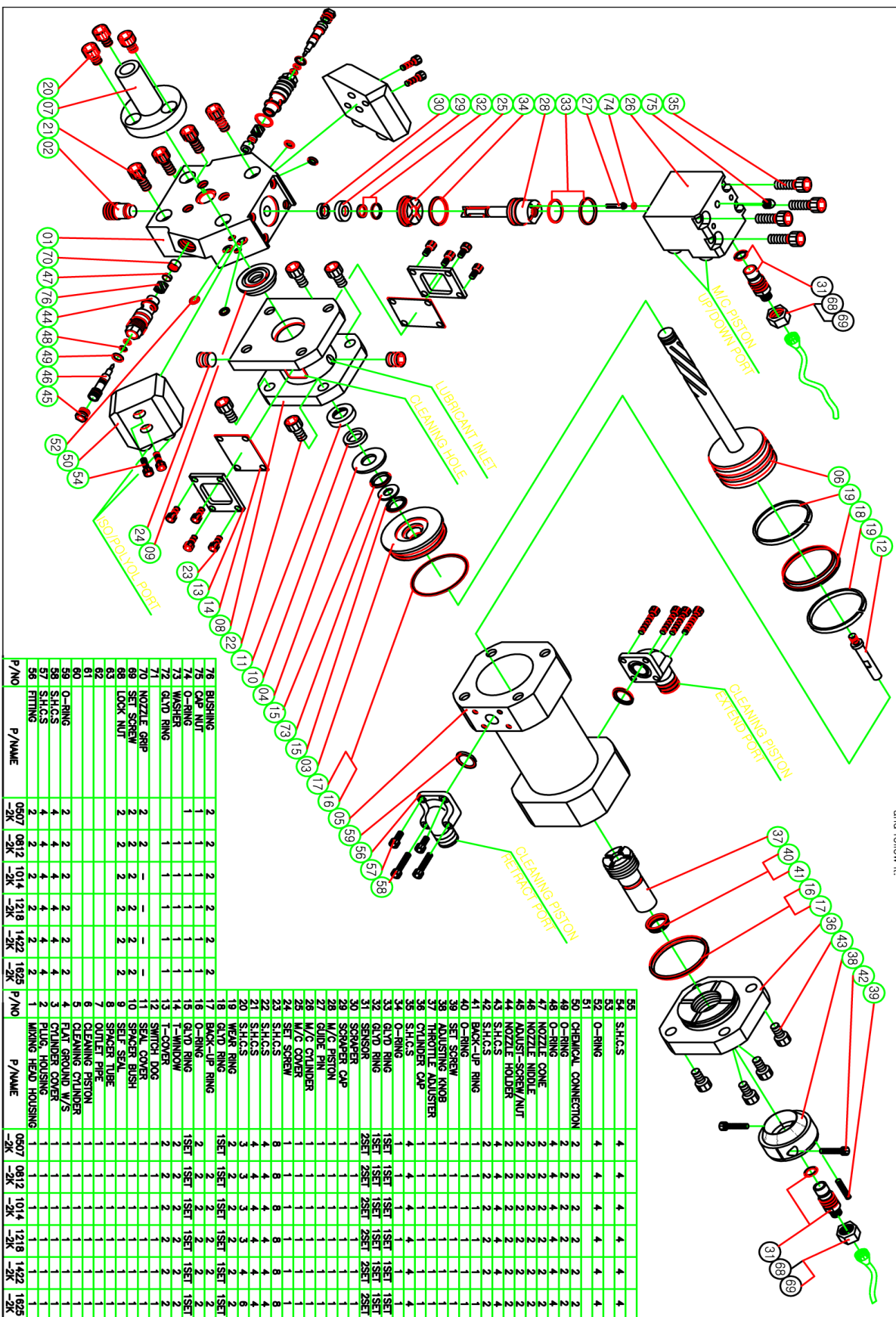
9. Recommended Bolting Torque

- 1) When assembly each parts of Mixing Head, follow requested bolting torque as belows.
- 2) When assembly or disassembly, do it diagonal orderly.
- 3) Please check each element not to come loose.

Thread	Recommended bolting torque(Nm)	Remarks
M5	9.5	
M6	16	
M8	39	
M10	77	
M12	135	
M14	215	
M16	330	

INSTRUCTIONS - PART LIST FOR MIXING HEAD DHV-SERIES

WARNING : When foam systems are started, CLEANING PISTON(06) ROD on this mixing head should have to be wetted with Mesamrol or DOP. So before started , supply lubricant into LUBRICANT INLET. And this mixing head be thoroughly cleaned by lubricant at the end of each shift.
Before starting to carry out any operation concerning this mixing head, read manual extremely, and follow it.



P/NO	P/NAME	0507	0512	1014	1218	1422	1625	P/NO	P/NAME	0507	0512	1014	1218	1422	1625
55	S.H.C.S	4	4	4	4	4	4	56	SCREW CAP	1	1	1	1	1	1
54	S.H.C.S	4	4	4	4	4	4	57	M/C PISTON	1	1	1	1	1	1
53	O-RING	4	4	4	4	4	4	58	ADJUSTING KNOB	1	1	1	1	1	1
52	O-RING	2	2	2	2	2	2	59	THROTTLE ADJUSTER	1	1	1	1	1	1
51	CHEMICAL CONNECTION	2	2	2	2	2	2	60	CYLINDER CAP	4	4	4	4	4	4
50	O-RING	2	2	2	2	2	2	61	S.H.C.S	4	4	4	4	4	4
49	O-RING	2	2	2	2	2	2	62	O-RING	2	2	2	2	2	2
48	O-RING	2	2	2	2	2	2	63	S.H.C.S	4	4	4	4	4	4
47	NOZZLE CONE	2	2	2	2	2	2	64	GLYO RING	2	2	2	2	2	2
46	NOZZLE MIDDLE	2	2	2	2	2	2	65	BACK-UP RING	2	2	2	2	2	2
45	ADJUST-SCREW/NUT	2	2	2	2	2	2	66	O-RING	2	2	2	2	2	2
44	NOZZLE HOLDER	2	2	2	2	2	2	67	GLYO RING	2	2	2	2	2	2
43	S.H.C.S	2	2	2	2	2	2	68	NOZZLE GRIP	2	2	2	2	2	2
42	S.H.C.S	2	2	2	2	2	2	69	SET SCREW	2	2	2	2	2	2
41	BACK-UP RING	2	2	2	2	2	2	70	LOOK NUT	2	2	2	2	2	2
40	SET SCREW	1	1	1	1	1	1	71	NOZZLE GRIP	2	2	2	2	2	2
39	ADJUSTING KNOB	1	1	1	1	1	1	72	GLYO RING	2	2	2	2	2	2
38	THROTTLE ADJUSTER	1	1	1	1	1	1	73	BACK-NUT	2	2	2	2	2	2
37	CYLINDER CAP	4	4	4	4	4	4	74	O-RING	1	1	1	1	1	1
36	S.H.C.S	4	4	4	4	4	4	75	GLYO RING	2	2	2	2	2	2
35	S.H.C.S	4	4	4	4	4	4	76	GLYO RING	2	2	2	2	2	2
34	O-RING	1	1	1	1	1	1	77	NOZZLE GRIP	2	2	2	2	2	2
33	GLYO RING	1	1	1	1	1	1	78	LOOK NUT	2	2	2	2	2	2
32	GLYO RING	1	1	1	1	1	1	79	NOZZLE GRIP	2	2	2	2	2	2
31	SENSOR	2	2	2	2	2	2	80	SET SCREW	2	2	2	2	2	2
30	SCREW CAP	1	1	1	1	1	1	81	LOOK NUT	2	2	2	2	2	2
29	M/C PISTON	1	1	1	1	1	1	82	GLYO RING	2	2	2	2	2	2
28	ADJUSTING KNOB	1	1	1	1	1	1	83	NOZZLE GRIP	2	2	2	2	2	2
27	THROTTLE ADJUSTER	1	1	1	1	1	1	84	LOOK NUT	2	2	2	2	2	2
26	CYLINDER CAP	4	4	4	4	4	4	85	GLYO RING	2	2	2	2	2	2
25	S.H.C.S	4	4	4	4	4	4	86	NOZZLE GRIP	2	2	2	2	2	2
24	SET SCREW	1	1	1	1	1	1	87	LOOK NUT	2	2	2	2	2	2
23	S.H.C.S	8	8	8	8	8	8	88	GLYO RING	2	2	2	2	2	2
22	S.H.C.S	4	4	4	4	4	4	89	NOZZLE GRIP	2	2	2	2	2	2
21	S.H.C.S	4	4	4	4	4	4	90	LOOK NUT	2	2	2	2	2	2
20	S.H.C.S	3	3	3	3	3	3	91	GLYO RING	2	2	2	2	2	2
19	WEAR RING	2	2	2	2	2	2	92	NOZZLE GRIP	2	2	2	2	2	2
18	GLYO RING	1	1	1	1	1	1	93	LOOK NUT	2	2	2	2	2	2
17	BACK-UP RING	2	2	2	2	2	2	94	GLYO RING	2	2	2	2	2	2
16	O-RING	2	2	2	2	2	2	95	NOZZLE GRIP	2	2	2	2	2	2
15	GLYO RING	1	1	1	1	1	1	96	LOOK NUT	2	2	2	2	2	2
14	O-RING	1	1	1	1	1	1	97	GLYO RING	2	2	2	2	2	2
13	O-RING	1	1	1	1	1	1	98	NOZZLE GRIP	2	2	2	2	2	2
12	SWITCH DOG	2	2	2	2	2	2	99	LOOK NUT	2	2	2	2	2	2
11	SEAL COVER	1	1	1	1	1	1	100	GLYO RING	2	2	2	2	2	2
10	SPACER BUSH	1	1	1	1	1	1	101	NOZZLE GRIP	2	2	2	2	2	2
9	SELF SEAL	1	1	1	1	1	1	102	LOOK NUT	2	2	2	2	2	2
8	OUTLET PIPE	1	1	1	1	1	1	103	GLYO RING	2	2	2	2	2	2
7	CLEANING PISTON	1	1	1	1	1	1	104	NOZZLE GRIP	2	2	2	2	2	2
6	FLAT GROUND W/S	1	1	1	1	1	1	105	LOOK NUT	2	2	2	2	2	2
5	CYLINDER COVER	1	1	1	1	1	1	106	GLYO RING	2	2	2	2	2	2
4	FLUID HOUSING	1	1	1	1	1	1	107	NOZZLE GRIP	2	2	2	2	2	2
3	MIXING HEAD HOUSING	1	1	1	1	1	1	108	LOOK NUT	2	2	2	2	2	2
2								109	GLYO RING	2	2	2	2	2	2
1								110	NOZZLE GRIP	2	2	2	2	2	2

Mixing Head Data Sheet

To : DUT KOREA Co., Ltd.

FAX NO: +82-51-202-0647

FROM:

CHARGE OF :

TEL :

FAX :

ISSUED DATE :

Mobile :

GENERAL

Model : DH - - K

Serial No :

Purchasing date :

Brought from :

Foaming cycle : sec

Applicated on : Rigid / Flexible / Semi-rigid

Total Output / Pouring Time : g/ sec

Mixing Ratio : A : B = : 100

System manufacturer :

Warranty and Service

DUT KOREA provides a limited warranty to the original purchaser of DUT MIXING HEAD against any defects in material or workmanship for period of **One year** from the date of shipment from DUT KOREA facilities.

In the event a part is suspected to be defective in Mixing head or workmanship, it must be returned by the original purchaser, freight prepaid. If the part is found to be defective in Mixing head or workmanship, as determined solely by DUT with a reasonable period of time following receipt of the defective part, full credit will be issued to the original purchase for the freight charges incurred in returning the defective part, and either credit will be issued for the replacement cost of the part or a replacement part will be forwarded no-charge, freight prepaid to the customer.

Replacement of parts defective in material or workmanship shall constitute complete fulfillment of DUT's obligations to the original purchaser. No other warranties, expressed or implied on any product it manufactures and / or sells, will be recognized by DUT unless aside warranty is in writing and approved in writing by an officer of DUT.

DUT shall not be held liable for any expenses resulting from loss, damage or accidents caused by the misuse of Mixing head.

Caution

We do not assure the problems as below

- *In case of disassembly without DUT's bylaws.(Please never touch the parts with torque seal and rubber control)*
- *If the Elastomer is hardened on cleaning piston, DUT do not assure the products*
(The problem is negligence of operator. Never forget to use Lubricant)

Contact Technical Support

DUT KOREA

914-4 Jangrim-Dong

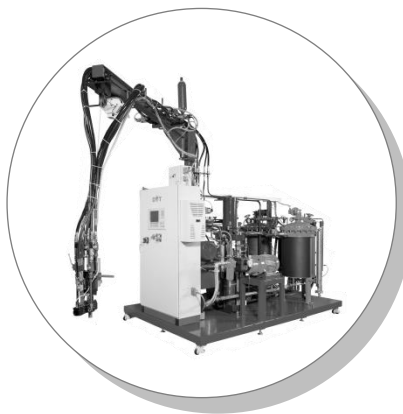
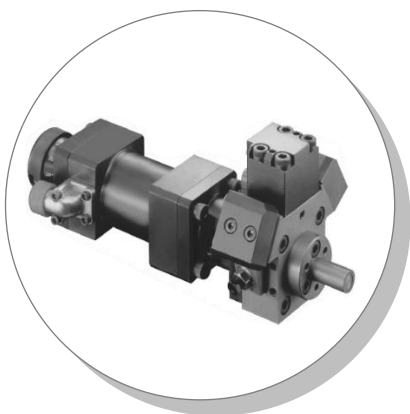
Saha-Gu, Busan

KOREA (Post Code: 604-050)

Tel : +82-51-202-0586

Fax : +82-51-202-0647

E-mail : webmaster@dutkorea.com



914-4, Jangrim-Dong, Saha-Gu, Busan, 604-040, Korea

Tel. +82-51-202-0586 Fax. +82-51-202-0647

webmaster@dutkorea.com www.dutkorea.com

COPYRIGHT(C)2011 DUTKOREA.,Ltd ALL RIGHT RESERVED DHV/DHVA101106